PRICE DISCRIMINATION
BY SELF-SELECTION
Overview

• Context: Frequently, firms cannot directly identify the different segments

• Concepts: versioning and self-selection, two-part tariffs, bundling; incentive and participation constraints

• Economic principle: If you charge different prices for the same product, expect arbitrage — unless you make the products slightly different
Self-selection schemes

- In most cases, seller cannot directly identify consumer type, but can still induce consumers to distinguish themselves.
- Versioning: design product lines that appeal to different consumers.
- Examples?
### Versioning 1.0

<table>
<thead>
<tr>
<th>Type</th>
<th>#</th>
<th>Not Rest</th>
<th>Restricted</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist</td>
<td>10</td>
<td>350</td>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td>Business</td>
<td>10</td>
<td>800</td>
<td>200</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Strategy 1:** Price single ticket (NR) at 350
  
  Revenue = $350 \times 20 = 7,000$

- **Strategy 2:** Price single ticket (NR) at 800
  
  Revenue = $800 \times 10 = 8,000$

- **Strategy 3:** Price (R,NR) at (300,800)
  
  Revenue = $300 \times 10 + 800 \times 10 = 11,000$
### Versioning 1.1

<table>
<thead>
<tr>
<th>Type</th>
<th>#</th>
<th>Not Rest</th>
<th>Restricted</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist</td>
<td>10</td>
<td>350</td>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td>Business</td>
<td>10</td>
<td>800</td>
<td>400</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Strategy 3:** Price (R,NR) at (300,800)
  
  Revenue = $300 \times 10 + 800 \times 10 = 11,000$

  Now it won’t work: business traveller will buy restricted fare.

- **Strategy 4:** Price (R,NR) at (300,700)
  
  Revenue = $300 \times 10 + 700 \times 10 = 10,000$

The key constraint is: $800 - p_{NR} \geq 400 - p_R$
Versioning summary

- A scheme to induce customers to select themselves into high and low prices
- Key constraint (incentive): you can’t make the inexpensive version too attractive to those willing to pay more
- Additional constraint (participation): cheap version must be sufficiently cheap that low types are willing to purchase
- Why it works: correlation between absolute valuation and cost (in terms of valuation) of restriction
- In practice, this is often based on years of experience of what the market will bear
Practice: baby iMac

- Market segment H (1 million) willing to pay $1,500 for iMac, $800 for stripped-down version
- Market segment L (2 million) willing to pay $600 for iMac, $500 for stripped-down version
- Production cost: $300 (either version)
- What is optimal pricing policy?
Practice: baby iMac

- Candidate strategy 1: sell full version, charge $1,500
  Profit: $(1500 - 300) \times 1\ m = \$1.2\ bn$

- Candidate strategy 2: sell full version, charge $600
  Profit: $(600 - 300) \times 3\ m = \$.9\ bn$

- Candidate strategy 3: sell full version for $1,200, stripped-down version for $500
  Profit: $(500 - 300) \times 2\ m + (1200 - 300) \times 1\ m = \$1.3\ bn$

- Note: $1,200 = 1,500 - (800 - 500)$
Bundling

• Examples
• Pure bundling and mixed bundling
• A form of versioning (why?)
## Bundling: recitals

<table>
<thead>
<tr>
<th>Type</th>
<th>#</th>
<th>Mozart</th>
<th>Cage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classical</td>
<td>40</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Sophisticated</td>
<td>40</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Eclectic</td>
<td>20</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

- **Strategy 1:** Price at 50 per ticket  
  Revenue = \(50 \times 40 \times 2 = 4,000\)

- **Strategy 2:** Price at 30 per ticket  
  Revenue = \(30 \times (40+20) \times 2 = 3,600\)

- **Strategy 3:** Price at 50 per ticket or 60 for series  
  Revenue = \(50 \times 40 \times 2 + 60 \times 20 = 5,200\)
Damaged goods

- Low value version has higher production cost than high value version
- Examples
- Clearly motivated by market segmentation
Coupons

- Examples
- A type of damaged good (why?)
- What is the correlation that makes it work?
Intertemporal discrimination

- Examples
- A type of damaged good (why?)
- The durable goods monopoly curse
Non-linear pricing

• Definition: unit price varies with quantity purchased

• Typical examples:
  – two-part tariff: fixed entry fee (F), per-unit use fee (P)
  – quantity discounts

• What is the optimal structure? What are the main obstacles to implementation?
Two-part tariffs 1.0

- Suppose each consumer demands several units (minutes of calls, hours at the gym, etc)
- Let $D(p)$ be each consumer's demand curve
- How can a two-part tariff extract more surplus from this consumer?
Two-part tariffs 1.0

Uniform pricing

Consumer surplus
Firm profit

Two-part tariff:
price per unit = \( MC \)
fixed fee = blue area
Practice: NPNG gym

- Monthly individual demand for hours: \( q = 15 - 2.5p \)
- Marginal cost: zero
- Optimal price per hour: \( p = 3 \) (from \( q = 7.5 \))
  
  Profit per customer: \( 3 \times 7.5 = 22.5 \)

- Optimal two-part tariff: usage fee = marginal cost = 0
  
  Fixed fee: \( \frac{1}{2} (15 \times 6) = 45 \) (consumer surplus)
  
  Profit per customer: 45

- Huge increase in profit (why?)
Two-part tariffs 2.0

- Suppose that different consumers have different demand curves $D_i(p)$ for each unit they consume
- How can a menu of two-part tariffs allow seller to implement a versioning strategy?
  - How are types defined?
  - What do different versions look like?
  - How does this relate to the damaged good strategy?
  - What are the participation and incentive constraints?
E-commerce and price discrimination

- Does it make price discrimination easier or more difficult?
Alternative selling mechanisms

• Who sets the price or prices?
  – Firm: pricing
  – Buyer: auctions
  – Both: negotiations

• Some common types of auctions:
  – Ascending auction (a.k.a. English)
  – Second-price sealed bid (a.k.a. Vickrey)
  – First-price sealed bid
  – First-price descending (a.k.a. Dutch)
  – Multi-unit (uniform price or discriminatory)

• Pros and cons of each type of auction. Pros and cons of auctions vis-à-vis pricing and negotiations.
Takeaways

• If identification is a problem, you may want/need to differentiate the products and use self-selection schemes: versioning, bundling, and so on.

• Key constraints on optimal pricing
  – Incentive constraint
  – Participation constraint